



Name: _____ Hour: _____ Date: _____

Can You Guess My IQ?

As part of a new transcript at our school, the counselors have decided to include an IQ score in addition to GPA. Will knowing the GPA help to predict IQ?

Five students requested that the counselors update their transcripts for them: Adam, Bernard, Christie, Deja, and Eldin. Their IQ scores are 110, 85, 120, 95, 105 but they have been all mixed up and the counselors don't know which IQ score goes with which student.

The guidance counselors are forced to predict the IQ for each student. Each counselor takes a different approach.

Counselor #1: The New Guy

The New Guy is so nervous about being wrong, so he wants to play it safe with his predictions and minimize his error. He decides to find the average IQ and use it as his prediction for all five of the students:

Student	Adam	Bernard	Christie	Deja	Eldin
Predicted IQ					

Counselor #2: The Veteran

The Veteran noticed an equation written on the board in the AP Statistics room: $IQ = 16 \cdot GPA + 57.3$. She realized that GPA can help her to make better predictions. She looks up the GPA of each student:

Adam GPA = 1.8
 Bernard GPA = 2.4
 Christie GPA = 2.9
 Deja GPA = 3.4
 Eldin GPA = 3.8

Then she used the line of best fit to make her predictions. $IQ = 16 \cdot GPA + 57.3$

Student	Adam	Bernard	Christie	Deja	Eldin
GPA	1.8	2.4	2.9	3.4	3.8
Predicted IQ					

Counselor #3: The Truth Seeker

Guidance counselor #3 pulled the five students out of class and found the truth.

Student	Adam	Bernard	Christie	Deja	Eldin
GPA	1.8	2.4	2.9	3.4	3.8
Actual IQ	85	95	110	105	120

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Who made the better predictions?

Now let's see which counselor made better predictions:

Counselor #1: The New Guy (used the mean IQ for every prediction)

Student	Adam	Bernard	Christie	Deja	Eldin
Actual IQ	85	95	110	105	120
Predicted IQ					
Error (Actual - Predicted)					
Squared error					

Sum of the squared errors:

Counselor #2: The Veteran (used the line of best fit for every prediction)

Student	Adam	Bernard	Christie	Deja	Eldin
GPA	1.8	2.4	2.9	3.4	3.8
Actual IQ	85	95	110	105	120
Predicted IQ					
Error (Actual - Predicted)					
Squared error					

Sum of the squared errors:

Who did better? Why?

Counselor #1 sum of squared errors: _____ Counselor #2 sum of squared errors: _____

Calculate the **percentage improvement** of the sum of squared errors from Guidance Counselor #1 to Guidance Counselor #2.

We also could find each counselor's typical error. Use algebra to turn the sum of the squared errors into the "average" error for Guidance Counselor #2.

Find the correlation (r), the coefficient of determination (r^2) and the standard deviation of the residuals (s) for the data using the calculator.

GPA	1.8	2.4	2.9	3.4	3.8
Actual IQ	85	95	110	105	120

$r =$

$r^2 =$

$s =$

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s and r^2

Important Ideas:

Check Your Understanding:

Fueleconomy.gov gives the city and highway fuel economy for all makes and models of vehicles back to 1984. The table gives the city and highway fuel economy (mpg) for a random sample of ten 2021 vehicles.

City fuel economy (mpg)	14.4	24.3	27.2	29.9	20.4	28.8	20.9	23.2	28.6	25.4
Highway fuel economy (mpg)	25.5	37.4	36.5	45.5	28.7	46.1	33.6	38.3	41.3	35.3

Analyze the data using the two-quantitative variable option on [stapplet.com](https://www.stapplet.com).

a. Find the equation of the LSRL. Write it below.

b. Find and interpret s .

c. Find and interpret the value of r^2 .